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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/840,069	05/04/2004	Michael L. Boucher	30014200-1110	6646

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EXAMINER
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STEELMAN, MARY J

ART UNIT	PAPER NUMBER
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2191

MAIL DATE	DELIVERY MODE
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08/09/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/840,069	<b>Applicant(s)</b> BOUCHER, MICHAEL L.	
	<b>Examiner</b> MARY STEELMAN	<b>Art Unit</b> 2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 May 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. Claims 1-16 are pending.

***Specification***

2. Applicant is requested to fill in the blank serial number on page 1.

***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 7-12 and 16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

5. Independent claim 7 recites "a computer-readable medium..." Page 12, line 22 of the Specification provides a definition for computer-readable medium that includes a non-statutory embodiment, "carrier wave." Claim may be amended to recite statutory embodiments: "A computer-readable storage medium..." Claims 8-12 are rejected for being dependent on a non-statutory parent claim and otherwise failing to cure such a deficiency.

6. Independent claim 16 recites, "A data processing system...comprising: means for..." The Specification, at page 16, line 21, recites that the system may be implemented in software alone. A claim for software per se is a non-statutory category. Claim deficiencies may be cured by adding hardware elements to claim language, such as a central processing unit, and memory, as supported in the Specification at page 12, line 10.

***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 1-16 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 6,381,735 B1 to Hunt.

Per claims 1, 7, 13, and 16:

A method (system / computer-readable medium) in a data processing system for optimizing a program, the method comprising the steps of:

-automatically analyzing a statistical profile of a program execution;

Hunt: Col. 4: 18-21, "The present invention pertains to classification of a section of software by matching the usage background of the section to a usage profile (statistical profile) determined by previous profiling software." Col. 27: 35-55, "In general, through scenario-based profiling or static analysis, the illustrated ADPS creates a profile for each application unit instantiated. The profile classifies the application unit in order to characterize the application unit's communication with other units during profiling and any constraints on its location. Information from the profiling scenarios or static analysis is generalized to predict application behavior for later executions. A mapping of generalized application unit profiles to specific machines in the network is generated. Application units instantiated during application execution are then matched to similar application unit profiles, and located on the appropriate machine in the network. The actual distribution is an approximate solution to the distributed partitioning problem: the optimal solution for a particular application execution can only be determined after execution has completed. The underlying assumption of automatic distributed

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partitioning is that past profiles are statistically accurate in describing future application executions. If, in fact, past profiles accurately predict future application executions, then future executions can be partitioned using the distribution derived from the profiles.”

-automatically optimizing the program based on at least one of the analysis, information about at least one prior compilation of the program, and information about at least one prior optimization of the program.

Hunt - Col. 23: 33-35, “The distribution optimization algorithm accepts a model of the decision problem and maps it onto a computer network. After all data has been gathered, it is the optimization algorithm that decides where application units will be placed in the network.”

Per claims 2, 8, and 14:

-the program is automatically optimized during a compilation.

Hunt – Col. 16: 34-51, “An application description set 220 describing the behavior of the application is prepared at step 210 for the application 200. The application description set 220 can be supplied by an external source that analyzes the application 200 in advance, or can be generated by the illustrated ADPS itself. The application description set 220 can include static and/or dynamic metadata describing the application. For example, in the COIGN system, the application description set 220 can include static metadata derived from metadata provided by a Microsoft IDL compiler (MIDL). Alternatively, the application description set 220 can include static metadata generated by the illustrated ADPS through static analysis techniques. Dynamic analysis techniques can be used by the illustrated ADPS to include dynamic metadata

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(such as dynamic descriptions of units, descriptions of actual inter-unit communication between the units of the application 200, and descriptions of how much time was spent in each unit in computation) in the application description set 220. “

Per claims 3, 9, and 15:

-the program is automatically optimized during a run-time compilation.

Hunt – Col. 17: 16-26, “A distribution scheme 50 is the result of applying the environment description set 230 to the application description set 220. The distribution scheme 250 includes a mapping of application units to locations in a distributed computing environment. The units can be classified using static metadata of the units. Alternatively, where run-time profiling was used to dynamically describe the units, the units can be classified according to dynamic behavior. At run-time, units of the application 200 are mapped using the distribution scheme 250 for location on an appropriate computer in the distributed computing environment.”

Per claims 4 and 10:

-interrupting the program;

Hunt – Col. 31: 45-57, “Borrowing from debugger techniques, breakpoint trapping of the COM DLL (284), instead of replacing the DLL, inserts an interception mechanism into the image of the COM DLL after it has been loaded into the application address space. At run time, the instrumentation system inserts a breakpoint trap at the start of each instantiation function. When execution reaches the function entry point, a debugging exception is thrown by the trap and caught by the instrumentation system. The major drawback to breakpoint trapping is that

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debugging exceptions suspend all application threads. In addition, the debug exception is caught in a second operating-system process. Interception via break-point trapping has a high performance cost.”

-recording an execution state of the program;

Hunt – Col. 19: 24-32, “Through scenario-based profiling, an ADPS can create a profile for each application unit instantiated during profiling runs of the application. The profile identifies and quantifies communication between the application unit and other units. The collection of profiles for all units in the application, together with the records of communications between units, can be included within the application description set 220 and used to decide where units should be placed in the network.”

-storing the recorded execution state to create the statistical profile.

Hunt – Col. 19: 12-23, “At step 204, the application 200 is executed in a scenario meant to model the expected use of the application 200. During execution, the application behaves normally while the numbers, sizes, and endpoints of all inter-unit messages are measured. At step 206, the user decides if profiling is finished. The application can be run through an arbitrary number of profiling scenarios. After profiling of the application is completed, the results from the scenario-based profiling are written (step 208) to the application description set 220. The application description set 220 can include structural description of the application as well as description of communication between units of the application.”

Col. 19: 51-55, “The environment description set 230 can be generated immediately before the

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application is to be distributed in a distributed computing environment, in this way describing the most recent state of the environment.”

Col. 35: 19-26, “At the end of the profiling, COIGN writes the summary log of inter-component communication to a file for later analysis. In addition to information about the number and sizes of messages and components in the application, the profile log also contains information used to classify components and to determine pair-wise component location constraints. Log files from multiple profiling executions can be combined and summarized during later analysis.”

Per claim 5:

-the information about at least one prior compilation of the program includes a profile of the program implemented during the at least one prior compilation.

Hunt – Col. 20: 17-27, “In an alternative embodiment, estimates of latency and bandwidth are periodically taken during execution of a distributed application. If the new estimates deviate beyond a preset threshold from previous estimates, the application is re-partitioned and distributed using the new estimates. In another embodiment, inter-unit communication is measured during distributed execution. If the communication characteristics of the distributed application deviate beyond a preset threshold from the communication characteristics used to determine the current distribution scheme, the distributed application is re-partitioned and re-distributed.”



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Per claim 6:

-the information about at least one prior optimization of the program includes a profile of at least one change made to the program during the at least one prior compilation.

Hunt – Col. 39: 9-20, “Alternatively, COIGN can automatically decide when usage differs significantly from profiled scenarios, and silently enables profiling for a period to re-optimize the distribution. The COIGN runtime already contains sufficient infrastructure to allow "fully automatic" distribution optimization. The lightweight version of the runtime, which relocates component instantiation requests to produce the chosen distribution, can count messages between components with only slight additional overhead. Run time message counts could be compared with relative message counts from the profiling scenarios to recognize changes in application usage.”

### *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (571) 272-3704. The examiner can normally be reached Monday through Thursday, from 7:00 AM to 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Zhen can be reached at (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned: 571-273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

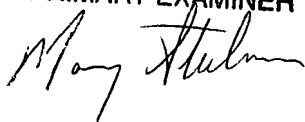
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary Steelman

08/04/2007

**MARY STEELMAN**  
**PRIMARY EXAMINER**

A handwritten signature in cursive script, appearing to read "Mary Steelman", written in black ink.